

# NASA TECH BRIEF

*Lewis Research Center*



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## Protective Coating for Salt-Bath Brazing

A protective coating applied to braze materials prior to salt-bath brazing facilitates the brazing process and results in superior brazed joints. The protective coating prevents deterioration of the braze material between the time the work is inserted in the salt bath and the time the braze material melts and flows on the surfaces to be joined.

In salt-bath brazing, metal parts are joined by fusing the contacting surfaces immersed in a molten-salt bath. Usually, the braze material is applied as a paste, powder suspension, or preform. However, when a bonded powder is placed in the molten-salt bath, the binder is burned off at such a rapid rate that either the braze material is dislodged or, following burnout of the binder, the movement of the dense molten salt erodes the braze material before it is fully melted. When solid preforms are used, the molten salt may erode the braze material as it melts but before it can wet the work and flow. The protective coating prevents these deficiencies and thereby ensures effective brazed joints.

One formulation for the coating consists of 90.1% graphite, 9.0% enameler's clay, and 0.9% algin binder. Other clays and binders common to the ceramic arts can also be used. For example, bentonite and kaolin may be used in lieu of enameler's clay, and carbowax, gum arabic and tragacanth may be substituted for the algin binder. While the indicated proportions of coating constituents are particularly effective, other proportions may be used, depending on the desired strength of the fired coating. Satisfactory results are obtainable using 70-92% graphite, 25-7.5% clay, and 5-0.5% binder. The coating constituents are mixed together simultaneously so

that the binder coats all particles of the graphite and bodying clay. When the mixture is applied to the braze-material surface, a tightly adherent coating is formed; the binder serves to bind together the coating constituents and the coating to the braze-material surfaces.

In use, the coating is thoroughly mixed with water, the amount of which depends on whether the coating is to be applied as a paste, in a bath, or as a spray. The mixture is then applied over the braze material which has been placed on the joint. The coating is dried to remove all moisture, and the work is immersed in the molten-salt bath. The coating acts as a sheath to keep the braze material intact during binder burnout. On completion of the brazing, the assembly is removed from the bath and cooled. Any salt and coating remaining on the surfaces are removed by washing.

The use of this coating is not detrimental to the salt bath. To the contrary, there is no contamination of the salt, and the graphite reduces any metal oxides in the bath to pure metal.

### Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer  
Lewis Research Center  
21000 Brookpark Road  
Cleveland, Ohio 44135  
Reference: B71-10381

### Patent status:

This invention has been patented by NASA (U.S. Patent No. 3,008,229) and royalty-free license rights

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will be granted for its commercial development. Inquiries about obtaining a license should be addressed to:

Patent Counsel  
Mail Code 500-311  
Lewis Research Center  
21000 Brookpark Road  
Cleveland, Ohio 44135

Source: C. A. Gyorgak and A. C. Francisco  
Lewis Research Center  
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